

### AMENDMENTS TO THE CLAIMS

Claims 1-22 (Canceled).

23. (Previously presented) A method of determining whether explosives or controlled substances are present in an object comprising confounders, comprising:

transporting the object through a cavity in a shielded apparatus, said cavity comprising one or more turns which preclude a straight line trajectory through the cavity;

generating neutron particles from a plurality of neutron sources by pulsing the neutron sources simultaneously, each source having an intensity of about  $10^7$  neutrons/second or less;

irradiating the object with the neutron particles to cause the object to generate gamma rays;

detecting the gamma rays with a plurality of gamma ray detectors;

analyzing the gamma counts associated with the object;

determining that an explosive or controlled substance is present in the object when the relative atomic percentages of elements comprising the object are substantially similar to the relative atomic percentages of elements associated with known explosives and controlled substances;

determining that an explosive or controlled substance is not present in the object when the relative atomic percentages of elements comprising the object are not substantially similar to the relative atomic

percentages of elements associated with known explosives and controlled substances; and

pulsing the neutron sources sequentially if it is determined that an explosive or controlled substance is present in the object.

24. (Currently amended) A method of determining whether explosives or controlled substances are present in an object comprising confounders, the method comprising:

irradiating the object with neutron particles from a plurality of neutron sources by pulsing the neutron sources simultaneously;

detecting gamma rays emitted by substances contained within the object in response to the irradiation;

determining gamma counts with a plurality of gamma ray detectors;

isolating common eigen value signatures of the substances contained within the object;

analyzing the common eigen value signatures using a plurality of analytical tools to produce a plurality of analyses;

subjecting the plurality of analyses to a hierarchy of classifiers to determine if at least one of an explosive~~[[,]]~~ or controlled substance, ~~or confounder~~ is present in the object; and

pulsing the neutron sources sequentially if it is determined that an explosive or controlled substance is present in the object to more accurately identify the location of the explosive or controlled substance in the object.

25. (Original) The method of claim 23, wherein the cavity is surrounded by water.

26. (Previously presented) The method of claim 23, wherein the neutron particles comprise 14.7 MeV neutrons.

27-28. (Canceled)

29. (Original) The method of claim 23, wherein the object is irradiated a first time and at least a second time.

30. (Original) The method of claim 29, wherein the neutron particles are generated by pulsing the neutron sources simultaneously at the first time.

31. (Original) The method of claim 30, wherein the neutron particles are generated by pulsing the neutron sources sequentially at the at least a second time.

32. (Original) The method of claim 23, wherein the plurality of neutron sources comprises at least 10 neutron sources.

33. (Canceled)

34. (Original) The method of claim 23, wherein the plurality of gamma ray detectors comprises at least 100 gamma ray detectors.

35. (Canceled)

36. (Currently amended) The method of claim 23, wherein the neutron sources are arranged in an array and wherein the array is arranged such that an equal number of neutron sources are disposed on at least two sides of the array.

37. (Original) The method claim 36, wherein each neutron source irradiates a predetermined area of the object.

38. (Currently amended) The method claim 23, wherein the neutron sources are arranged in an array, and wherein the array further comprises the plurality of gamma ray detectors.

39. (Canceled)

40. (Previously presented) The method of claim 38, wherein the array is arranged such that an equal number of gamma ray detectors are disposed on at least two sides of the array.

41. (Previously presented) The method of claim 23, wherein the cavity further comprises a transport mechanism for moving the object through the cavity.

42. (Currently amended) The method claim 41, wherein the neutron sources are arranged in an array, and wherein the array is disposed inside the cavity and the object passes through the array as the transport mechanism moves the object through the cavity.

43. (Currently amended) The method of claim 23, wherein the elements comprising the explosives and controlled substances are ~~selected~~ from the group consisting of carbon, oxygen, and nitrogen.

44. (Currently amended) The method of claim 23, wherein the explosives and controlled substances are ~~selected~~ from the group including TNT, PETN, RDX, HMX, Ammonium Nitrate, Plutonium, Uranium, and drugs.

45. (Canceled)

46. (Canceled)

47. (Currently amended) The method of claim [[46]] 23, wherein the confounders include materials ~~are selected~~ from a group consisting of nylon and food.

48. (Previously presented) The method of claim 23, wherein the shielded apparatus has dimensions of no more than six meters in length, three meters in width, and three meters in height.

49. (Currently amended) A method of determining whether explosives or controlled substances are present in an object comprising confounders, the method comprising:

- irradiating the object with neutron particles a first time from a plurality of neutron sources by pulsing the neutron sources simultaneously wherein the object generates gamma rays;

- detecting the gamma rays emitted by substances contained within the object in response to the first irradiation;

- determining gamma counts with a plurality of gamma ray detectors;

- isolating common eigen value signatures of the substances contained within the object to generate signature data;

- forming a correlation function of the signature data;

- decomposing wavelets of the correlation function of the signature data;

- comparing the incoming decomposed signature data with a library of signatures to determine if at least one of an explosive~~[[,]]~~ or controlled substance, ~~or confounder~~ is present in the object; and

- irradiating the object with neutron particles a second time by pulsing the neutron sources sequentially if it is determined that an explosive

or controlled substance is present in the object to more accurately identify the location of the explosive or controlled substance in the object.

50. (Previously presented) The method of claim 49, further comprising:

detecting the gamma rays emitted by substances contained within the object in response to the second irradiation; and

identifying the location of the explosive or controlled substance within the object based on the detected gamma rays emitted by substances contained within the object in response to the second irradiation.